

APPLICATION OF CATALYTIC NANOPARTICLES TO HIGH TEMPERATURE WATER SYSTEMS TO REDUCE STRESS CORROSION CRACKING

Abstract of Disclosure

A method and system for reducing stress corrosion cracking in a hot water system, such as a nuclear reactor, by reducing the electrochemical corrosion potential of components exposed to high temperature water within the structure. The method comprises the steps of: providing a reducing species to the high temperature water; and providing a plurality of noble metal nanoparticles having a mean particle size of up to about 100 nm to the high temperature water during operation of the hot water system. The catalytic nanoparticles, which may comprise at least one noble metal, form a colloidal suspension in the high temperature water and provide a catalytic surface on which a reducing species reacts with least one oxidizing species present in the high temperature water. The concentration of the oxidizing species is reduced by reaction with the reducing species on the catalytic surface, thereby reducing the electrochemical corrosion potential of the component.